

CLAIMS

1. A preform for a container comprised of orientable thermoplastic material and arranged so that the resultant blown container will include a handle or like support structure; said preform comprising a moulded structure having a neck portion and an expandable portion below the neck, said neck including a locating ring above the expandable portion and a solid stem of orientable thermoplastics material projecting from the preform and moulded integrally therewith which when the container is formed constitutes the handle.
2. A method of forming a container having an integral handle; said method comprising:
  - (a) forming a preform having a neck portion and an expandable portion below the neck portion, said neck portion including a locating ring above the expandable portion and a solid stem of orientable thermoplastics material projecting from the preform and moulded integrally therewith, and
  - (b) performing a blow moulding operation on said preform to expand the expandable portion to form the body of the container.
3. The method of claim 2 wherein the neck portion and integral handle are subjected to a crystallisation step.
4. The method of claim 2 wherein the blow moulding operation includes supporting the stem whilst the preform is blown in a manner whereby at least a portion of the external side of the tube expands to encircle at least a lower portion of the stem so as to form an enclosed grip portion between the external side and the solid stem.
5. The method of claim 4 wherein the enclosed grip portion allows at least two fingers of the adult human hand to pass therethrough.

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6. The method of claim 2 wherein the stem is formed so as to have an I-shaped cross-section at least throughout that portion of the stem where it projects from the external side of said tube.
7. A parison for an injection stretch blow moulding process, said parison formed by an injection process including two separate points of injection.
8. The parison of claim 7 wherein a first point of injection permits injection of non-recycled PET or like thermoplastics material.
9. The parison of claim 7 or 8 wherein a second point of injection permits injection of PET or like thermoplastics material incorporating at least a portion of recycled material.
10. The parison of claim 7 or 8 wherein said first point of injection is for the formation of that part of the parison which will be stretched during a stretch blow moulding operation on the parison.
11. The parison of claim 9 wherein said second point of injection is for the formation of those parts of said parison which will remain unexpanded or substantially unexpanded in a stretch blow moulding operation on said parison.
12. A container manufactured from a two stage injection stretch blow moulding process, said container including a graspable handle affixed at at least a first point and a second point to said container so as to form an enclosed area between the handle and the bottle and through which the fingers of a human hand may be passed.
13. The container of claim 12 wherein said first point of connection comprises an integral connection between the handle and the container and is formed in said first step of said two step operation.
14. The container of claim 13 wherein said second point of connection is formed during said second step of said two step operation.

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15. The container of claim 14 wherein said handle at said second point of interconnection includes a bulbous portion adapted to be at least partially enfolded by a portion of said container as it is blown during said second step of said two step operation whereby a mechanically interlocked connection is formed at said second point of connection of said handle to said container.
16. The container of claim 15 wherein said bulbous portion comprises one of an upwardly extending hook, a downwardly extending hook, a bulb or a combination of one or more thereof.
17. The container of any one of claims 12 to 16 wherein an adhesive is utilised to assist connection at said second point of interconnection.
18. The preform of Claim 1 further including a locating ring immediately below which is a first non-expanding region and a second non-expanding region.
19. The preform of Claim 18 wherein the first non-expanding region is formed so as to be slightly raised or otherwise differentiated from the expandable portion of parison.
20. The preform of Claim 18 or 19 wherein the second non-expanding region is not differentiated from the expandable portion of parison.
21. The preform of any one of Claims 18-20 wherein the stem includes a first rib integrally moulded with and extending from locating ring.
22. The preform of Claim 21 which also includes a second rib integrally moulded with and extending from said second non-expanding region.
23. The preform of Claim 22 which further includes a rib connector integrally moulded with and extending from first non-expanding region and forming a continuous connection between said first rib and said second rib throughout the length of said stem.

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24. The preform of any one of Claims 18-23 and wherein said second non-expanding region forms part of a temperature transition zone.
  25. The preform of any one of Claims 18-24 and wherein said first non-expanding region forms part of said temperature transition zone.
  26. The preform of Claim 24 or Claim 25 wherein deformation of said temperature transition zone takes place during a stretch blow moulding process.
  27. The preform of any one of Claims 18-26 manufactured by a two stage injection moulding process wherein material is injected at different locations in the die to form a preform adapted to be composed from more than one type of material.
  28. The preform of Claim 27 wherein during at least one stage of said two stage process an inner wall and outer wall of said preform is formed, said inner wall adapted to be made from a different material from said outer wall.
  29. A container stretch blow moulded from the preform of any one of claims 18-28.
  30. A container made from PET material and stretch blow moulded from the preform of any one of Claims 18-29.
  31. A container comprised of biaxially orientable thermoplastic material manufactured from a two stage injection stretch blow moulding process, said container including a graspable handle affixed at at least a first point and a second point to said container so as to form an enclosed area between the handle and the bottle and through which the fingers of a human hand may be passed.
  32. The container of claim 31 wherein said first point comprises an integral connection between the handle and the container and is formed in said first step of said two step operation.
  33. The container of claim 31 or claim 32 wherein said second point of connection is formed during said second step of said two step operation.

34. The container of claim 33 wherein said handle at said second point of interconnection includes a bulbous portion adapted to be at least partially enfolded by a portion of said container as it is blown during said second step of said two step operation whereby a mechanically interlocked connection is formed at said second point of connection of said handle to said container.
35. The container of claim 34 wherein said bulbous portion comprises one of an upwardly extending hook, a downwardly extending hook, a bulb or a combination of one or more thereof.
36. The container of any one of claims 31 to 35 wherein an adhesive is utilised to assist connection at said second point of interconnection.
37. The container of any one of claims 31 to 36 further including a locating ring at a neck portion thereof immediately below which is a first non-expanding region.
38. The container of claim 37 further including a second non-expanding region below said locating ring.
39. The container of Claim 37 or Claim 38 wherein the first non-expanding region is formed so as to be slightly raised or otherwise differentiated from the expandable portion of parison.
40. The container of Claim 37 or Claim 38 wherein the second non-expanding region is not differentiated from the expandable portion of parison.
41. The container of any one of Claims 31-40 wherein said handle includes a first rib integrally moulded with and extending from said locating ring.
42. The container of Claim 41 wherein said handle includes a second rib integrally moulded with and extending from said second non-expanding region.
43. The container of Claim 41 or Claim 42 which further includes a rib connector integrally moulded with and extending from said first non-expanding region and forming a continuous connection between said first rib

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- and said second rib throughout the length of said handle.
- 44. The container of any one of Claims 31-43 and wherein said second non-expanding region forms part of a temperature transition zone.
  - 45. The container of any one of Claims 31-44 and wherein said first non-expanding region forms part of said temperature transition zone.
  - 46. The container of any one of Claims 31-45 wherein deformation of said temperature transition zone takes place during a stretch blow moulding process.
  - 47. The container of any one of Claims 31-46 manufactured by a two stage injection moulding process wherein material is injected at different locations whereby said container is composed from more than one type of material.
  - 48. The container of Claim 47 wherein during at least one stage of said two stage process an inner wall and outer wall of said preform is formed, said inner wall adapted to be made from a different material from said outer wall.
  - 49. A method of production of an integral handle PET container including the step of shrouding a handle stem portion of a preform during preheating of said preform preparatory to a stretch blow moulding step.
  - 50. The method of Claim 49 wherein the handle stem is fully supported in a mould cavity against movement during the stretch blow moulding operation.
  - 51. A container comprised of biaxially orientable thermoplastic material manufactured from a two stage injection stretch blow moulding process; said two stage process comprising a first stage in which a preform is manufactured and a second stage in which said preform is reheated and biaxially stretched to form said container; said container including a graspable handle affixed at at least a first point of connection and a second point of connection to said container so as to form an enclosed area between said handle and said container and through which at least

- two fingers of a human hand can pass; and wherein said first point of connection comprises an integral connection between the handle and the container and is formed in said first stage of said two stage process.
52. The container of claim 51 wherein said second point of connection is formed during said second stage of said two stage process.
53. The container of claim 52 further including a locating ring at a neck portion thereof.
54. The container of claim 53 wherein said handle at said second point of connection includes a bulbous portion which is at least partially enfolded by a portion of said container as it is blown during said second stage of said two stage process whereby a mechanically interlocked connection is formed at said second point of connection of said handle to said container.
55. The container of claim 54 wherein said bulbous portion comprises one of an upwardly extending hook, a downwardly extending hook, a bulb or a combination of one or more thereof.
56. The container of claim 55 wherein an adhesive is utilised to assist connection at said second point of connection.
57. The container of claim 54 further including a first non-expanding region immediately below said locating ring.
58. The container of claim 57 further including a second non-expanding region below said first non-expanding region.
59. The container of claim 57 wherein said first non-expanding region is formed so as to be slightly raised or otherwise differentiated from that portion of said container which is fully biaxially oriented during said second stage of said two stage process.
60. The container of claim 58 wherein said second non-expanding region is not differentiated from that portion of said container which is fully biaxially oriented during said second stage of said two stage process.

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61. The container of claim 58 or claim 59 wherein minor expansion of said second non-expanding region takes place during said second stage of said two stage process.
62. The container of claim 58 wherein said handle includes a first rib integrally moulded with and extending from said locating ring.
63. The container of claim 62 wherein said handle includes a second rib integrally moulded with and extending from said second non-expanding region.
64. The container of claim 63 which further includes a rib connector integrally moulded with and extending from said first non-expanding region and forming a continuous connection between said first rib and said second rib throughout the length of said handle.
65. The container of claim 58 wherein said second non-expanding region forms part of a temperature transition zone.
66. The container of claim 57 wherein said first non-expanding region forms part of a temperature transition zone.
67. The container of claim 66 wherein deformation of said temperature transition zone takes place during a stretch blow moulding process.
68. The container of claim 51 manufactured by said two stage injection moulding process and wherein material is injected at different locations during formation of said preform during said first stage of said two stage process whereby said container can be composed from more than one type of material.
69. The container of claim 68 wherein during said first stage of said two stage process an inner wall and outer wall of said preform is formed, said inner wall made from a different material from said outer wall.
70. The container of any one of claims 51-69 further including a discontinuity region as defined in the specification.
71. The container of Claim 70 wherein said discontinuity region lies in a plane which lies at an acute angle to

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- the horizontal, said discontinuity region extending substantially throughout the circumference of said container.
72. The container of any one of Claim 70 or Claim 71 wherein said discontinuity region at its point closest to said handle is located between a first end and a second end of said handle.
73. A preform from which the container of any one of Claims 51 to 72, said preform including more than one wall profile.
74. The preform of Claim 73 wherein said preform has a first wall profile closest to its neck followed by a second wall profile immediately there below and separated therefrom by a first transition zone.
75. The preform of Claim 74 wherein said preform further includes a third wall profile immediately below said second wall profile and separated therefrom by a second transition zone.
76. The container of any one of claims 31 to 38 wherein said graspable handle is affixed at said second point by way of a tag.
77. The container of claim 76 wherein said tag extends from a lower edge of a wide portion of said handle and is integrally connected at a mid circumferential portion of said container.
78. The container of claim 76 or 77 wherein said lower edge of said wide portion of said handle includes a landing portion which rests on but is not otherwise connected to or enveloped by an outer surface of said container.
79. A preform from which the container of any one of claims 76 to 78 is blown, said preform including a tag extending from a lower edge of a handle portion of said preform; said tag being integrally connected to said preform.